



June 24, 2014

Mr. Danny O'Connor
Tetra Tech Inc.
415 Oak Street
Kansas City, Missouri 64106

Re: C14 Analysis for BetaChem Site
Work Order: 351105

Dear Mr. O'Connor:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on June 20, 2014. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at (843) 556-8171, ext. 4505.

Sincerely,

Heather Shaffer
Project Manager

Purchase Order: 1105919
Enclosures

**Receipt Narrative
for
Tetra Tech, Inc. (BetaChem 1105919)
SDG: 351105**

June 24, 2014

Laboratory Identification:

GEL Laboratories LLC
2040 Savage Road
Charleston, South Carolina 29407
(843) 556-8171

Summary:

Sample receipt: The sample arrived at GEL Laboratories LLC, Charleston, South Carolina on June 20, 2014 for analysis. The sample was delivered with proper chain of custody documentation and signatures. All sample containers arrived without any visible signs of tampering or breakage. There are no additional comments concerning sample receipt.

Sample Identification: The laboratory received the following sample:

| <u>Laboratory ID</u> | <u>Client ID</u> |
|-----------------------------|-------------------------|
| 351105001 | Bulked Flammables |

Case Narrative:

Sample analyses were conducted using methodology as outlined in GEL's Standard Operating Procedures. Any technical or administrative problems during analysis, data review, and reduction are contained in the analytical case narratives in the enclosed data package.

The enclosed data package contains the following sections: Case Narrative, Chain of Custody, Cooler Receipt Checklist, Data Package Qualifier Definitions and data from the following fractions: Radiochemistry.

Heather Shaffer

Heather Shaffer
Project Manager

Table of Contents

| | |
|--|----|
| Chain of Custody and Supporting Documentation..... | 1 |
| Laboratory Certifications..... | 4 |
| Radiological Analysis..... | 6 |
| Sample Data Summary..... | 11 |
| Quality Control Data..... | 13 |

Chain of Custody and Supporting Documentation

| | | |
|---|--|--|
| Page: <u>1</u> of <u>1</u> | <h1 style="text-align: center;">GEL Chain of Custody and Analytical Request</h1> | <p>GEL Laboratories, LLC 2040 Savage Road Charleston, SC 29407 Phone: (843) 556-8171 Fax: (843) 766-1178</p> |
| Project #: <u>K9025140061</u> | | |
| GEL Quote #: _____ | | |
| COC Number ⁽¹⁾ : _____ | | |
| PO Number: _____ | | |
| <p style="text-align: center;">GEL Work Order Number: <u>351105</u></p> | | |

[illegible]

| Comments | of cc | 2/11/42 |
|------------------|---------|---------|
| Collected by: | | |
| Send Results To: | Johnnie | 2-11-42 |

| Sample ID | * Date Collected | Collected (Military) | QC Code (c) | Field Filtered (b) | Sample Matrix (d) | CA Reg | total nu | specific QC |
|-----------|------------------|-------------------------|----------------|-----------------------|----------------------|--------|----------|-------------|
| | (mm-dd-yy) | | | | | | | |

| | | | | | |
|-------------------|---------|------|----|---|---|
| BULKED FLAMMABLES | 6-18-14 | 1600 | WW | 1 | X |
|-------------------|---------|------|----|---|---|

[illegible]

$\frac{A}{B} = \frac{C}{D}$

[illegible]

| | | | | | |
|------------------------|-------|-----------------------|--------------|----------|---|
| TAT Requested: Normal: | Rush: | Specify: 5 day | Fax Results: | Yes / No | Circle Deliverable: C of A / QC Summary / Level 1 / Level 2 / Level 3 / Level 4 |
|------------------------|-------|-----------------------|--------------|----------|---|

This sample was collected from bulked Flammable liquids

Other _____

☒ Central

☐ Mountain

| Relinquished By (Signed) | Date | Time | Received by (signed) | Date | Time |
|--------------------------|---------|------|----------------------|-----------------|------|
| | 6-10-11 | | | | |
| | | | GEL PM: | Heather Shaffer | |

| | | |
|---|---|-------------------------|
| 2 | 2 | Airbill #: 804593478198 |
|---|---|-------------------------|

2.) QC Codes: N = Normal Sample, TB = Trip Blank, FD = Field Duplicate, EB = Equipment Blank, MS = Matrix Spike Duplicate Sample, G = Grab, C = Composite

3.) Field Filtered: For liquid matrices, indicate with a + or - for yes the sample was field filtered or - N - for sample was not field filtered.

6.) Preservative Type: **HA** = Hydrochloric Acid, **NI** = Nitric Acid, **SH** = Sodium Hydroxide, **SA** = Sulfuric Acid, **AA** = Ascorbic Acid, **HX** = Hexane, **ST** = Sodium Thiosulfate, If no preservative is added = leave field blank

WHITE = LABORATORY
YELLOW = FILE
PINK = CLIENT

SAMPLE RECEIPT & REVIEW FORM

| | | | |
|--|-----|--------------------------------------|--|
| Client: <u>TETR</u> | | SDG/AR/COC/Work Order: <u>351105</u> | |
| Received By: <u>H. Taylor</u> | | Date Received: <u>062014</u> | |
| Suspected Hazard Information | Yes | No | *If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation. |
| COC/Samples marked as radioactive? | | <input checked="" type="checkbox"/> | Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <u>000</u> |
| Classified Radioactive II or III by RSO? | | <input checked="" type="checkbox"/> | If yes, Were swipes taken of sample containers < action levels? |
| COC/Samples marked containing PCBs? | | <input checked="" type="checkbox"/> | |
| Package, COC, and/or Samples marked as beryllium or asbestos containing? | | <input checked="" type="checkbox"/> | If yes, samples are to be segregated as Safety Controlled Samples, and opened by the GEL Safety Group. |
| Shipped as a DOT Hazardous? | | <input checked="" type="checkbox"/> | Hazard Class Shipped: UN#: |
| Samples identified as Foreign Soil? | | <input checked="" type="checkbox"/> | |

| Sample Receipt Criteria | Yes | NA | No | Comments/Qualifiers (Required for Non-Conforming Items) |
|---|-------------------------------------|-------------------------------------|----|--|
| 1 Shipping containers received intact and sealed? | <input checked="" type="checkbox"/> | | | Circle Applicable: Seals broken Damaged container Leaking container Other (describe) |
| 2 Samples requiring cold preservation within (0 ≤ 6 deg. C)?* | | <input checked="" type="checkbox"/> | | Preservation Method: Ice bags Blue ice Dry ice <u>None</u> Other (describe) *all temperatures are recorded in Celsius <u>19</u> |
| 2a Daily check performed and passed on IR temperature gun? | <input checked="" type="checkbox"/> | | | Temperature Device Serial #: <u>30462961</u> Secondary Temperature Device Serial # (If Applicable): |
| 3 Chain of custody documents included with shipment? | <input checked="" type="checkbox"/> | | | |
| 4 Sample containers intact and sealed? | <input checked="" type="checkbox"/> | | | Circle Applicable: Seals broken Damaged container Leaking container Other (describe) |
| 5 Samples requiring chemical preservation at proper pH? | | <input checked="" type="checkbox"/> | | Sample ID's, containers affected and observed pH: If Preservation added, Lot#: |
| 6 VOA vials free of headspace (defined as < 6mm bubble)? | | <input checked="" type="checkbox"/> | | Sample ID's and containers affected: |
| 7 Are Encore containers present? | | <input checked="" type="checkbox"/> | | (If yes, immediately deliver to Volatiles laboratory) |
| 8 Samples received within holding time? | <input checked="" type="checkbox"/> | | | ID's and tests affected: |
| 9 Sample ID's on COC match ID's on bottles? | <input checked="" type="checkbox"/> | | | Sample ID's and containers affected: |
| 10 Date & time on COC match date & time on bottles? | <input checked="" type="checkbox"/> | | | Sample ID's affected: |
| 11 Number of containers received match number indicated on COC? | | <input checked="" type="checkbox"/> | | Sample ID's affected: |
| 12 Are sample containers identifiable as GEL provided? | | <input checked="" type="checkbox"/> | | |
| 13 COC form is properly signed in relinquished/received sections? | <input checked="" type="checkbox"/> | | | |
| 14 Carrier and tracking number. | | <input checked="" type="checkbox"/> | | Circle Applicable: FedEx Air FedEx Ground UPS Field Services Courier Other <u>8045 9347 8198</u> |

Comments (Use Continuation Form if needed):

Laboratory Certifications

List of current GEL Certifications as of 24 June 2014

| State | Certification |
|---------------------------|------------------------------|
| Alaska | UST-110 |
| Arkansas | 88-0651 |
| CLIA | 42D0904046 |
| California NELAP | 01151CA |
| Colorado | SC00012 |
| Connecticut | PH-0169 |
| Delaware | SC000122013-10 |
| DoD ELAP/ ISO17025 A2LA | 2567.01 |
| Florida NELAP | E87156 |
| Foreign Soils Permit | P330-12-00283, P330-12-00284 |
| Georgia | SC00012 |
| Georgia SDWA | 967 |
| Hawaii | SC000122013-10 |
| Idaho Chemistry | SC00012 |
| Idaho Radiochemistry | SC00012 |
| Illinois NELAP | 200029 |
| Indiana | C-SC-01 |
| Kansas NELAP | E-10332 |
| Kentucky | 90129 |
| Louisiana NELAP | 03046 (AI33904) |
| Louisiana SDWA | LA130005 |
| Maryland | 270 |
| Massachusetts | M-SC012 |
| Michigan | 9976 |
| Mississippi | SC000122013-10 |
| Nebraska | NE-OS-26-13 |
| Nevada | SC000122014-1 |
| New Hampshire NELAP | 2054 |
| New Jersey NELAP | SC002 |
| New Mexico | SC00012 |
| New York NELAP | 11501 |
| North Carolina | 233 |
| North Carolina SDWA | 45709 |
| Oklahoma | 9904 |
| Pennsylvania NELAP | 68-00485 |
| Plant Material Permit | PDEP-12-00260 |
| South Carolina Chemistry | 10120001 |
| South Carolina GVL | 23611001 |
| South Carolina Radiochemi | 10120002 |
| Tennessee | TN 02934 |
| Texas NELAP | T104704235-14-9 |
| Utah NELAP | SC000122014-12 |
| Vermont | VT87156 |
| Virginia NELAP | 460202 |
| Washington | C780-12 |
| Wisconsin | 999887790 |

Radiological Analysis

**Radiochemistry Case Narrative
Tetra Tech, Inc. (TETR)
SDG 351105**

Method/Analysis Information

Product: Liquid Scint C14, Liquid
Analytical Method: EPA EERF C-01 Modified
Analytical Batch Number: 1397927

| Sample ID | Client ID |
|------------------|---|
| 351105001 | Bulked Flammables |
| 1203114174 | Method Blank (MB) |
| 1203114175 | 351105001(Bulked Flammables) Sample Duplicate (DUP) |
| 1203114176 | 351105001(Bulked Flammables) Matrix Spike (MS) |
| 1203114177 | Laboratory Control Sample (LCS) |

The samples in this SDG were analyzed on an "as received" basis.

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-003 REV# 15.

Calibration Information:

Calibration Information

All initial and continuing calibration requirements have been met.

Standards Information

Standard solutions for these analysis are NIST traceable or verified with a NIST traceable standard and used before the expiration dates.

Sample Geometry

All counting sources were prepared in the same geometry as the calibration standards.

Quality Control (QC) Information:

Blank Information

The blank volume is representative of the sample volume in this batch.

Designated QC

The following sample was used for QC: 351105001 (Bulked Flammables).

QC Information

All of the QC samples meet the required acceptance limits with the following exceptions: Refer to Data Exception Report (DER).

Technical Information:**Holding Time**

All sample procedures for this sample set were performed within the required holding time.

Sample Re-prep/Re-analysis

None of the samples in this sample set required reprep or reanalysis.

Recounts

Sample 1203114174 (MB) was recounted due to the quench number being outside the calibration range. The recount is reported. Sample 1203114176 (Bulked Flammables) was recounted to verify sample result. The recount result is similar to the original result. Recount is reported.

Miscellaneous Information:**Data Exception (DER) Documentation**

Data exception reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. The following DER was generated for this SDG: DER 1308194 was generated due to Failed Recovery for MS/PS. 1. The matrix spike 1203114176 does not meet the recovery requirement due to the matrix of the sample. 1. Reporting results.

Sample-Specific MDA/MDC

The MDA/MDC reported on the certificate of analysis is a sample-specific MDA/MDC.

Additional Comments

Additional comments were not required for this sample set.

Qualifier Information

Manual qualifiers were not required.

Certification Statement

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Qualifier Definition Report for

TETR056 Tetra Tech, Inc. (BetaChem 1105919)

Client SDG: 351105 GEL Work Order: 351105

The Qualifiers in this report are defined as follows:

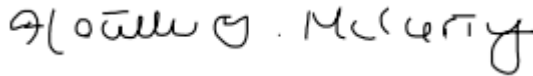
- * A quality control analyte recovery is outside of specified acceptance criteria
- ** Analyte is a Tracer compound
- U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.

Review/Validation

GEL requires all analytical data to be verified by a qualified data reviewer. In addition, all CLP-like deliverables receive a third level review of the fractional data package.

The following data validator verified the information presented in this data report:

Signature:



Name: Heather McCarty

Date: 25 JUN 2014

Title: Analyst II

| DATA EXCEPTION REPORT | | | |
|---|---|--|-----------------------------|
| Mo.Day Yr. 25-JUN-14 | Division: Radiochemistry | Quality Criteria: Specifications | Type: Process |
| Instrument Type: LSC | Test / Method: EPA EERF C-01 Modified | Matrix Type: Liquid | Client Code: TETR |
| Batch ID: 1397927 | Sample Numbers: See Below | | |
| Potentially affected work order(s)(SDG): 351105 Application Issues: Failed Recovery for MS/PS | | | |
| Specification and Requirements | | DER Disposition: | |
| Exception Description: | | | |
| 1. The matrix spike 1203114176 does not meet the recovery requirement due to the matrix of the sample. | | 1. Reporting results. | |

Originator's Name:

Lyndsey Pace 25-JUN-14

Data Validator/Group Leader:

Lesley Anderson 25-JUN-14

Sample Data Summary

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Company : Tetra Tech Inc.
Address : 415 Oak Street

Kansas City, Missouri 64106
Contact: Mr. Danny O'Connor
Project: C14 Analysis for BetaChem Site

Report Date: June 25, 2014

Client Sample ID: Bulked Flammables
Sample ID: 351105001
Matrix: Misc Liquid
Collect Date: 18-JUN-14
Receive Date: 20-JUN-14
Collector: Client

Project: TETR00056
Client ID: TETR056

| Parameter | Qualifier | Result | Uncertainty | MDC | TPU | RL | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|-----------|-----------|--------|-------------|-----|-----|----|-------|----|---------|------|------|-------|------|
|-----------|-----------|--------|-------------|-----|-----|----|-------|----|---------|------|------|-------|------|

Rad Liquid Scintillation Analysis

Liquid Scint C14, Liquid "As Received"

| | | | | | | | | | | | | | |
|-----------|--|-----|---------|------|---------|------|--------|--|------|----------|------|---------|---|
| Carbon-14 | | 160 | +/-5.64 | 3.05 | +/-30.2 | 3.00 | pCi/mL | | BYS1 | 06/23/14 | 1504 | 1397927 | 1 |
|-----------|--|-----|---------|------|---------|------|--------|--|------|----------|------|---------|---|

The following Analytical Methods were performed

| Method | Description |
|--------|------------------------|
| 1 | EPA EERF C-01 Modified |

| Surrogate/Tracer Recovery | Test | Batch ID | Recovery% | Acceptable Limits |
|---------------------------|------|----------|-----------|-------------------|
|---------------------------|------|----------|-----------|-------------------|

Notes:

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

Quality Control Data

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: June 25, 2014

Page 1 of 2

Client : Tetra Tech Inc.
415 Oak Street

Kansas City, Missouri

Contact: Mr. Danny O'Connor

Workorder: 351105

| Parmname | NOM | Sample | Qual | QC | Units | RPD% | REC% | Range | Anlst | Date | Time |
|--------------------------|-----------|---------|------|---------|--------|------|--------|------------|-------|----------|-------|
| Rad Liquid Scintillation | | | | | | | | | | | |
| Batch | 1397927 | | | | | | | | | | |
| QC1203114175 | 351105001 | DUP | | | | | | | | | |
| Carbon-14 | | 160 | | 145 | pCi/mL | 9.63 | | (0%-20%) | BYS1 | 06/23/14 | 15:37 |
| | Uncert: | +/-5.64 | | +/-5.41 | | | | | | | |
| | TPU: | +/-30.2 | | +/-27.5 | | | | | | | |
| QC1203114177 | LCS | | | | | | | | | | |
| Carbon-14 | 75.8 | | | 73.4 | pCi/mL | | 96.8 | (75%-125%) | BYS1 | 06/23/14 | 16:09 |
| | Uncert: | | | +/-4.04 | | | | | | | |
| | TPU: | | | +/-14.2 | | | | | | | |
| QC1203114174 | MB | | | | | | | | | | |
| Carbon-14 | | | U | -0.0653 | pCi/mL | | | | BYS1 | 06/24/14 | 14:13 |
| | Uncert: | | | +/-1.68 | | | | | | | |
| | TPU: | | | +/-1.68 | | | | | | | |
| QC1203114176 | 351105001 | MS | | | | | | | | | |
| Carbon-14 | 75.8 | 160 | | 201 | pCi/mL | | 54.5 * | (75%-125%) | BYS1 | 06/24/14 | 13:41 |
| | Uncert: | +/-5.64 | | +/-6.25 | | | | | | | |
| | TPU: | +/-30.2 | | +/-37.9 | | | | | | | |

Notes:

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

The Qualifiers in this report are defined as follows:

- ** Analyte is a Tracer compound
- < Result is less than value reported
- > Result is greater than value reported
- BD Results are either below the MDC or tracer recovery is low
- FA Failed analysis.
- H Analytical holding time was exceeded
- J Value is estimated
- K Analyte present. Reported value may be biased high. Actual value is expected to be lower.
- L Analyte present. Reported value may be biased low. Actual value is expected to be higher.
- M M if above MDC and less than LLD
- M REMF Result > MDC/CL and < RDL
- N/A RPD or %Recovery limits do not apply.
- N1 See case narrative
- ND Analyte concentration is not detected above the detection limit
- NJ Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Q One or more quality control criteria have not been met. Refer to the applicable narrative or DER.
- R Sample results are rejected
- U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.
- UI Gamma Spectroscopy--Uncertain identification

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Workorder: 351105

Page 2 of 2

| Parmname | NOM | Sample Qual | QC | Units | RPD% | REC% | Range | Anlst | Date | Time |
|----------|--|-------------|----|-------|------|------|-------|-------|------|------|
| UJ | Gamma Spectroscopy--Uncertain identification | | | | | | | | | |
| UL | Not considered detected. The associated number is the reported concentration, which may be inaccurate due to a low bias. | | | | | | | | | |
| X | Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier | | | | | | | | | |
| Y | Other specific qualifiers were required to properly define the results. Consult case narrative. | | | | | | | | | |
| ^ | RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry. | | | | | | | | | |
| h | Preparation or preservation holding time was exceeded | | | | | | | | | |

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.

** Indicates analyte is a surrogate/tracer compound.

^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.

For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.